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Renewable energy investment and job creation; a cross-sectoral assessment for the Czech Republic with reference to EU benchmarks



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ABSTRACT

The development of renewable energy sources has been primarily justified on the ground of environmental policies and energy security, but new jobs opportunities and establishment of new economy sectors may be equally important co-benefits from investments in this sector. The main goal of this paper is to assess the employment benefits of investments in renewable energy in the Czech Republic. We examine the level and rate of the development of the renewable energy sector in the Czech Republic in terms of ('green') job creation for the period 2008–2013, in comparison to data from other EU countries, including Germany as a leading early investor in renewables. Whilst the deployment of renewable energy in the Czech Republic has succeeded to create a significant number of jobs (more than 20 000 employees in 2010), our analysis illustrates a strong dependency of job creation on the continuation of financial incentives. We also find that biomass and waste energy processing offer the highest employment per MWh, which benefits employment in (economically fragile) rural areas. We discuss the question of competitiveness of a country that was not amongst the early adopters of renewables, arguing that the technical skills of the labour force in the Czech Republic provide a potential for more sustained investments in the sector.

1. Introduction

Affordable and reliable access to energy services lies at the heart of government energy policy, but there are always several other objectives to consider, from considerations of geopolitics, industrial and social policy (e.g. extending the electricity grid to the entire population; creating and maintaining employment), to concerns about environmental sustainability (e.g. smog, acid rain and since the 1990s greenhouse gas emissions). These multiple policy objectives come into play also when we consider investments into sub-sections of the energy system. The rapid growth of renewable energy generation in the European Union is underpinned by targets expressed in MWh and CO₂ equivalents; the Europe 2020 Strategy aims for 20% of energy from renewable sources on total energy consumption and 10% of green – renewable energy used in transport by 2020, whilst achieving 20% decrease of greenhouse gases emissions until 2020 and an increase of

energy efficiency by 20% (-all in reference to 1990 levels; [1]). But the overall success of the investment in renewable energy will not only be measured in terms of achieving those targets. The support for renewable energy through tax payers' money will also be assessed (by proponents, opponents, government evaluators) through other criteria, such as cost-effectiveness, environmental and social impacts and energy security (e.g. in terms of national self sufficiency in energy production). This paper aims to evaluate one such criterion; the extent to which renewable energy developments have been beneficial in terms of job creation. The Czech republic is presented as a case study of a country with an economic legacy of energy intensive manufacturing and a political legacy of post-socialist transition, rapid economic restructuring and recent adjustments to EU targets and regulations.

The paper is structured as follows. First the literature on renewable energy and (green) job creation is reviewed. Secondly recent developments of renewable energy and associated financial incentives in the

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Czech Republic are analysed. Having collated statistics from relevant sources, quantification of the creation of employment in the renewable energy sector is performed, looking at individual renewable energy (RE) types; biomass, wind power, photovoltaics, biofuels, geothermal energy, solar thermal energy, biogas, waste, heat pumps, small hydro power. In the final part of the paper, conclusions from the analysis are drawn, and several recommendations for suitable policy actions in the renewable energy sector are provided.

2. Literature review; green growth and renewable energy

In the last few years, the concept of so called 'green growth' has been widely discussed within EU countries as a more sustainable and more environmentally friendly path of economic development. This concept puts the emphasis on the sustainable use of natural sources and consequent improvement of the quality of life of the population, social justice and reduction of environmental risks [2–4] and [5]. Seeking to project leadership in this field, the European Union has incorporated green growth into the Europe 2020 Strategy. At a global level this concept resonates in the Organisation for Economic Co-operation and Development [6], and the United Nations Environment Programme [7]. Public and private sector investment in green growth leads to the creation of new jobs (so called 'green jobs') in various sectors of the economy in activities linked to environmental issues [8–10] and [11]. An important part of green jobs are those in the renewable energy sector. At the most basic level, employment in the renewable energy sector can be divided into construction and operation [12]. Other authors identify three job categories: technological development; installation/uninstallation; maintenance [13], or manufacturing; operation; fuel extraction and processing [14] – the latter category only being relevant to biomass energy. Employment in research and development (R&D) of renewable energy technologies may be also added as a category of employment, but the Czech Republic relies mainly on R&D carried out in other countries. Different types of renewable energy jobs contribute differently to national or regional development. Cameron and Zwaan [15] argue that the most long-term benefits for given regions are linked to the location high-tech companies and research institutes, which focus on R&D. Factories for assembling of renewable energy facilities and units provide a less secure type of regional employment. Highly depended on the cost of low and semi-skilled labour force, such factories are easily moved to other regions [16] and [17]. Many studies discuss the problem of employment in renewable energy in the context of the life cycle of individual products/facilities (e.g. [18] or [19]).

Lehr et al. [20] argues, that the best way to increase the number of jobs in the renewable energy sector in a given region (state) is to generate power for export. On the other hand, this solution is in contradiction with the paradigmatic environmental benefits of renewable energy, which should be ideally generated within decentralized system and locally consumed to reduce transport costs and transmission losses [21] and [22]. Thus, impacts of renewable energy developments on labour markets should be assessed in the context of not only economic, but also social and environmental contributions, which are sometimes underestimated [23] and [24]. As evidenced by Waclawek et al. [25], one of difficult tasks for investors in renewable energy is to find suitable workers with appropriate science and technology skills and engineering knowledge, since boom of this sector creates high demand for highly educated workers like project managers, engineers and operating workers as well [26–28] and [29]. Such labour demand may cause problems particularly in Central European countries who suffer significant brain drain; free labour movement in the EU draws skilled professionals towards Western Europe where the salaries are much higher.

Studies from various countries, including Spain (e.g. [30]) and China [31], report gaps between the demand and supply of qualified workers in domestic RE markets. Links between employment in the RE

sector and welfare impacts (multiplier effects) have been studied by [32] and rigorously reviewed by [33], pointing out that due to strong expected growth of the renewable energy sector, potential welfare impacts should be more wisely planned and managed. On the other hand, direct employment effects of the RE sector have been studied for various countries, including Germany [20,34] and [35], Japan [36] and Jordan [37], indicating significant impacts of the RE sector on domestic labour markets.

3. Methodology and data

The aim of the paper is to analyse contribution of the RE sector to employment and thus indirectly to competitiveness of the economy of the Czech Republic. As in many countries, detailed evidence of employment in the Czech RE sector is lacking. This data gap is in part due to the official national statistics office being late to adopt the RE sector as a separate category of employment.

There are two generic approaches to address this gap. First of all input-output models or analytical models might be applied [13]. Data used for analyses in this paper originate from the annually updated database EurObserv'ER and in databases of the International Renewable Energy Agency. These databases have been developed by means of application of analytical models, since they gather data from government entities (e.g. ministries, statistical agencies, energy regulatory offices), industry representatives and sectoral associations (biogas, wind or solar energy associations etc.). In comparison to the analytical models, the latter also capture data on indirect employment in the RE sector. In short, above mentioned database were utilized because (a) renewable energy is not singled out as a individual sector in the national economic, trade or labour statistics in the Czech Republic; and (b) usage of these databases enables comparability of analyses between various EU countries (a similar methodology for gathering of data was employed).

On the other hand, the data in mentioned databases are only available until 2013; an important shortcoming given the strong rates of change in the RE sector. Employment in individual types of RE technologies is surveyed (biogas, biomass, biofuels, wind, solar, geothermal energy, as well as Czech projects smaller than 10 MW using heat pumps, waste and small hydro-energy). Data on installed capacities and production of electricity were supplied by the Energy Regulatory Office of the Czech Republic and the International Renewable Energy Agency.

In the absence of a national database that covers changes in employment in renewable energy sector in the Czech Republic, the annually updated French database EurObserv'ER was utilized as the primary source of data. This database records both direct and indirect jobs in renewable energy sector in individual countries of the European Union. Data on employment have been gathered from a wide variety of sources, especially from the national statistical office (Czech Statistical Office – www.czso.cz) and national energy agency (Energy Regulatory Office – www.eru.cz) of the Czech Republic. Additional data on costs connected to governmental support for renewable sources in the Czech Republic originated in already mentioned the Energy Regulatory Office and Ministry of Trade and Industry of the Czech Republic (www.mpo.cz). The methods used in this paper include policy document analysis, descriptive statistics and trend analysis (spatial and temporal), coupled with a literature review to benchmark the findings.

4. The energy sector in the Czech Republic. An overview

In last 25 years the energy system of the Czech Republic has been transformed. The primary impetus was the rapid transition to a market economy and deep restructuring of energy sector and energy intensive industries, which resulted in the reduction of pressure on the environment and rationalizing resource management. The last 20 years have seen further transformations in the energy system, driven by climate

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